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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,744	10/01/2004	Douglas D. Coolbaugh	BUR920040091US1	5743

44152 7590 02/22/2006

GREENBLUM & BERNSTEIN, P.L.C.  
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RESTON, VA 20191

EXAMINER
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DICKEY, THOMAS L

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 02/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/711,744

Applicant(s)

COOLBAUGH ET AL.

Examiner

Thomas L. Dickey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 1-8 and 14-22 is/are allowed.
- 6) ☒ Claim(s) 9-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

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## DETAILED ACTION

1. The amendment filed on 12/21/2005 has been entered.

### ***Claim Rejections - 35 USC § 102***

2. Claims 9-13 stand rejected under 35 U.S.C. § 102(b) as being anticipated by KRUTSICK (6,066,884).

Krutsick discloses a Schottky barrier diode, comprising a semiconductor substrate 71; at least one separation region 77 bounding an active area 73 formed on the semiconductor substrate 71; a portion of a guard ring 75 on the substrate 71; and an electrode 74 formed on a surface of the semiconductor substrate 71 in the active area 73 to form a Schottky junction, wherein the at least one separation region 77 reduces parasitic capacitance about the Schottky junction, the at least one separation region 77 is substantially formed in the active region to eliminate at least one portion (said at least one portion being the four portions labeled "x" in figures 10 and 11. Compare to prior art figures 1 and 2. The portion of prior art guard ring 13 that previously existed in region "x" has been eliminated from the guard ring 13 of figures 1 and 2 to form the guard ring 75 of figures 10 and 11, substantially reducing parasitic capacitance by eliminating the close relationship that had existed between the prior art guard ring and the prior art electrode) of the guard ring 75 at the portion where the at least one separation region 77 is located, the at least one separation region 77 is silicon dioxide and thus a

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dielectric material selected from a group consisting of an oxide, a polymer, a glass, and a nitride, the at least one separation region 77 comprises a plurality (four) of separation regions 77, the plurality of separation regions 77 bound the active area 73 in one or two dimensions, and the Schottky junction has edges spaced away from the separation region 77 bounding the active area 73. Note figures 9-11 and column 4 lines 5-42 of Krutsick. Compare figures 1 and 2 of Krutsick.

### ***Response to Arguments***

3. Applicant's arguments filed 12/21/2005 have been fully considered but they are not persuasive.

It is argued, at page 10 of the remarks, that "Applicants acknowledge, for example, that KRUTSICK discloses various embodiments of a Schottky diode having an active region which is bounded by a guard ring 13, 75 [but because] it is apparent from a fair review of each of Figs. 3, 5, 7 and 10 of KRUTSICK that the disclosed guard rings 13, 75 completely surround the active regions ... KRUTSICK also cannot disclose or suggest that the at least one separation region is substantially formed in the active region to eliminate at least one portion of the guard ring at the portion where the at least one separation region is located (claim 9)." Applicants apparently labor under the misapprehension that "portion" has the same meaning as "segment." As Applicants recognize from Krutsick's figure 10, guard ring 75 has four segments forming a complete ring. However, as explained above, a portion of each segment has been

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eliminated, as can be seen from comparing figures 10 and 11 to prior art figures 1 and 2.

***Allowable Subject Matter***

4. Claims 1-8 and 14-22 are allowed over the references of record because none of these references disclosed or can be combined to yield the claimed invention such as a Schottky barrier diode, comprising an active area; a guard ring that is one of disjointed, a non-closed loop, and missing a portion in at least one dimension; at least one separation region bounding the active area; and an electrode formed in the active area to form a Schottky junction, wherein the at least one separation region reduces parasitic capacitance about the Schottky junction, as recited in claim 1, or such as a process for forming a Schottky barrier diode, comprising the steps of: forming an active area in a substrate; forming a guard ring that is one of disjointed, a non-closed loop, and missing a portion in at least one dimension; forming an electrode on the substrate in the active area to form a Schottky junction; and forming at least one separation region on the substrate where the at least one separation region is bounded on one side by the active area, wherein the at least one separation region reduces parasitic capacitance about the Schottky junction.

With regard to claim 1 Keller et al. 5,665,993 discloses a Schottky barrier diode, comprising an active area 83; at least one separation region 84,85 bounding the active area 83; and an electrode 81 formed in the active area 83 to form a Schottky junction,

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wherein the at least one separation region 84,85 reduces parasitic capacitance about the Schottky junction. Note figure 2C, column 6 lines 59-67, and column 7 lines 5-11 of Keller et al. However, Keller et al. neither discloses nor suggests the above combination, itself in combination with a guard ring that is one of disjointed, a non-closed loop, and missing a portion in at least one dimension.

With regard to claim 14 Keller et al. 5,665,993 discloses a process for forming a Schottky barrier diode, comprising the steps of forming an active area 83 in a substrate; forming an electrode 81 on the substrate in the active area 83 to form a Schottky junction; and forming at least one separation region 84,85 on the substrate where the at least one separation region 84,85 is bounded on one side by the active area 83, wherein the at least one separation region 84,85 reduces parasitic capacitance about the Schottky junction. Note figure 2C, column 6 lines 59-67, and column 7 lines 5-11 of Keller et al. However, Keller et al. neither discloses nor suggests the above steps itself in combination with a step of forming a guard ring that is one of disjointed, a non-closed loop, and missing a portion in at least one dimension.

### ***Conclusion***

**5. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L Dickey whose telephone number is 571-272-1913. The examiner can normally be reached on Monday-Thursday 8-6.

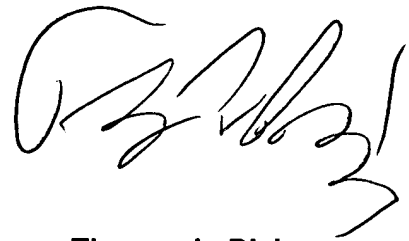
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L Dickey whose telephone number is 571-272-1913. The examiner can normally be reached on Monday-Thursday 8-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you

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have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'T. Dickey', with a stylized flourish at the end.

**Thomas L. Dickey**  
**Patent Examiner**  
**Art Unit 2826**  
**01/06**